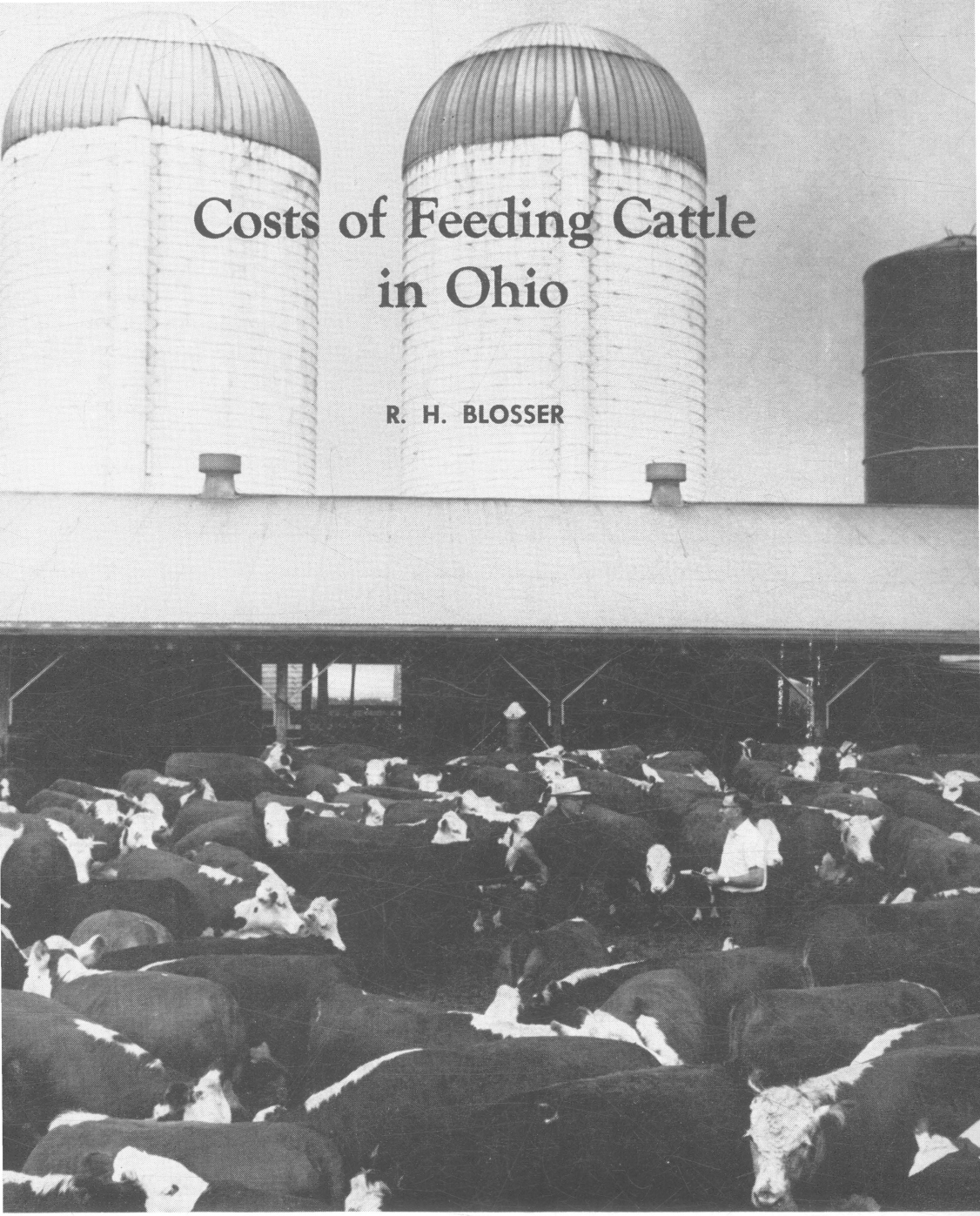
Costs of Feeding Cattle in Ohio

R. H. BLOSSER



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CONTENTS

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PREFACE

Professor Robert H. Blosser completed the first draft of this publication in March 1967. After a long illness, he died Sept. 29, 1967.

Representing his final work, this research circular is a good example of Professor Blosser's many publications summarizing applied farm management research results. His perseverance and productivity will be long missed by his many associates and Ohio farmers.

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Costs of Feeding Cattle in Ohio[1]

R. H. BLOSSER[2]

OBJECTIVES

The main objectives of this study were:

1. To determine the physical inputs used to produce beef under varying conditions.
2. To determine the costs of producing beef for different farm situations.
3. To determine how the following factors affect the cost of producing beef:
    a. Weight of cattle when started on feed.
    b. Size of feeding operation.
    c. Rate of gain.

COLLECTION OF DATA

Detailed information on beef feeding was obtained from 168 records kept by cattle feeders. Ninety-one records were kept in 1963 and 77 records were kept in 1964. Continuous records for the 2-year study period were kept by 67 farmers, 24 farmers kept records only for 1963, and 10 farmers kept records only for 1964. These farmers were located in Fulton, Henry, Putnam, Wood, Hancock, Pickaway, and Clinton counties. Data were collected on all items connected with the raising of feeder cattle to slaughter weights.

The first step in obtaining the study information was to compile a list of farmers who fed beef cattle and who might keep the necessary records. This list was obtained mainly from county agricultural agents and vocational agriculture teachers. The second step was to contact each farmer to determine if he would participate in the study. At this time, each farmer agreeing to cooperate in the project was given detailed instructions for keeping records on his beef cattle enterprise. The third step was to visit each cooperator two or three times during the

[1]Special thanks are given to Dr. D. H. Doster for his leadership in the collection and preliminary compilation of the data used in this study and to Dr. C. R. Weaver, statistician, Ohio Agricultural Research and Development Center, for his assistance in summarizing the data. Dr. Doster, formerly in the Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Research and Development Center, is now a member of the Department of Agricultural Economics, Purdue University.

[2]Professor, Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Research and Development Center (Deceased).

year and assist him in keeping his records. During each of these visits the fieldman collected additional data which was not recorded by the farmer. The fourth step was to collect the record books at the end of the year.

Although this sampling procedure permits a possible bias in favor of record keepers, this possible bias was accepted because of the need for accurate and complete records of the amounts of labor and feed used.

The number of cattle fed annually per farm ranged from 24 to 2925 head. Thirty-two percent of the records were for herds below 100 cattle; 32 percent were for herds of 100 to 199 cattle; 15 percent were for herds of 200 to 299 cattle; and 21 percent were for herds of 300 or more cattle.

ANALYSIS OF DATA

Records for both years were treated as 168 different observations regarding the way feeder cattle were raised to slaughter weights. Although the management of the individual farms was assumed to be the same from year to year, the inherent capacity of the cattle to put on weight changed because new herds were purchased each year.

This study showed that costs of production per 100 lb. of gain varied considerably from year to year on the same farm. For example, 33 percent of the farmers with continuous records had production costs which varied up to $2 per 100 lb. of gain from 1963 to 1964; 24 percent had costs which varied from $2 to $3.99; 25 percent had costs which varied from $4 to $5.99; and 18 percent had costs which varied more than $6 per 100 lb. of gain during the 2-year study period.

PRICES USED

Prices used in calculating costs were as follows: labor, $1.50 per hour; tractor power, $1.25 per hour; corn, $1.10 per bushel; oats, $.65 per bushel; hay, $22 per ton; corn silage, $8 per ton plus storage; and grass silage, $6 per ton plus storage. Protein supplement, which includes minerals, salt, and antibiotics, was charged at actual cost. The average cost for supplement was $5.20 per 100 lb. for all farms in the study.

Interest at 5 percent was figured against all operator and landlord owned capital invested in the beef enterprise. Borrowed capital was charged at the actual rate paid by the farmer. No charge was made for bedding. The cost of bedding was assumed to equal the value of the manure produced.

Other costs such as feed grinding, veterinary, and electricity were charged at the actual prices paid by the farmers.

LOW COST GROUP vs. HIGH COST GROUP

Costs of producing 100 lb of beef for different levels of management are shown in Table 1 The average cost of producing 100 lb of gain on beef cattle was $25 12 Cost of feed amounted to $17 85 per 100 lb of beef produced or 71 percent of the total cost.

Size of cattle purchased ranged from 322 to 930 lb. The average purchase weight per animal for all farms was 570 lb. and the average selling weight was 1012 lb.

For the entire study, the number of cattle fed to slaughter weights averaged 237 head per farm The average daily gain in weight was 1 75 lb. of beef or 442 lb for the 253-day feeding period

TABLE 1.—Average Costs to Produce 100 Lb. of Beef in Ohio Under Different Levels of Management, 1963 and 1964.

	Average		
	56 Low Cost Farms	56 High Cost Farms	168 Farms or Entire Study
Feed Costs			
Corn and Cob Meal	$ 5 39	$10 91	$ 7 60*
Shelled Corn	2 12	1 92	2 47
Oats	10	11	13
Protein Supplement	2 57	3 58	3 17
Corn Silage	2 94	2 90	2 95
Grass Silage	06	22	18
Hay	80	1 44	1 05**
Pasture	11	03	07*
Feed Grinding Hired	14	36	23**
Feed Costs	14 23	21 47	17 85**
Other Costs			
Labor	$ 1 25	$ 2 60	$ 1 79**
Tractor Power	36	60	43**
Veterinary	17	20	19
Truck Automobile Telephone & Electricity	23	25	27
Buildings and Equipment	2 16	3 48	2 78**
Taxes and Interest on Investment in Cattle	1 47	2 25	1 81
Other Costs	5 64	9 38	7 27
Total Costs	$19 87	$30 85	$25 12**
Number of Cattle Fed per Farm	288	176	237
Gain in Wt per Head for Feeding Period Lb	498	354	442
Average Number of Days Cattle Were Fed	276	222	253
Gain in Weight per Head per Day Lb	1 85	1 60	1 75**
Weight of Purchased Cattle per Head Lb	505	646	570**
Weight of Cattle Sold per Head Lb	1003	1000	1012
Feed Cost per 100 Lb of Gain	$14 23	$21 47	$17 85**
Building Investment per 100 Lb of Gain	$14 83	$21 86	$17 54*
Death Loss Percent	1 33	1 15	1 28

*Differences in related means significant at the 05 level

**Differences in related means significant at the 01 level

Charges for the various items and their relative importance in the total cost of producing 100 lb. of beef were: feed, including hired grinding and processing, $17.85 or 71 percent; buildings and equipment, $2.78 or 11 percent; labor, $1.79 or 7 percent; taxes and interest on investment in cattle, $1.81 or 7 percent; and miscellaneous, $.89 or 4 percent.

Figures in Table 1 show that one-third of the farmers in the study produced 100 lb. of gain at an average cost of only $19.87. In contrast, another one-third of the farmers had beef production costs averaging $30.85, or $10.98 higher. In other words, the high cost group of farmers spent more than 50 percent more than the low cost group to produce 100 lb. of beef.

In comparing the two cost figures, some consideration should be given to the fact that the high cost group of farmers fed out heavier weight cattle than the low cost group. Light weight cattle produce considerably cheaper gains than heavy animals.

From the standpoint of beef production, the high cost group of farmers differed from the low cost group in the following ways: (1) they spent about 50 percent more for feed to produce 100 lb. of gain; (2) they used more than twice as much labor to produce 100 lb. of beef; and (3) they had about one-half more invested in buildings and equipment per 100 lb. of gain produced.

Differences in the costs of producing 100 lb. of beef between the low and high cost groups of farms were: feed, $7.24; buildings and equipment, $1.32; labor, $1.35; taxes and interest on investment in cattle, $.78; and miscellaneous, $.29.

The average amounts of labor, tractor power, and feed used to produce 100 lb. of beef for different levels of management are given in

TABLE 2.—Average Amounts of Labor, Tractor Power, and Feed Used per Farm to Produce 100 Lb. of Beef in Ohio Under Different Levels of Management, 1963 and 1964.

	Average Inputs		
	56 Low Cost Farms	56 High Cost Farms	168 Farms or Entire Study
Labor, Hours	.83	1.73	1.19
Tractor Power, Hours	.29	.48	.34
Corn and Cob Meal, Lb.	343	694	484
Shelled Corn, Lb.	108	98	126
Oats, Lb.	5	5	6
Protein Supplement, Lb.	52	67	61
Corn Silage, Lb.	735	725	737
Grass Silage, Lb.	20	73	60
Hay, Lb.	73	131	96

Table 2. Labor inputs include not only the direct labor used to care for the cattle but also such jobs as grinding feed on the farm, hauling bedding and manure, and repairing cattle buildings and equipment.

COSTS FOR DIFFERENT PURCHASE WEIGHTS

Costs of producing 100 lb. of beef for different weight cattle are shown in Table 3. The cost of producing 100 lb. of beef was $7.43 less

TABLE 3.—Average Costs per Farm to Produce 100 Lb. of Beef in Ohio for Different Purchase Weights of Cattle, 1963 and 1964.

	Purchase Weights			
	Less Than 450 Lb. Average 408	450-574 Lb. Average 504	575-699 Lb. Average 629	700 Lb. and Above Average 773
Feed Costs				
Corn and Cob Meal	$ 5.99	$ 7.39	$ 7.17	$10.01
Shelled Corn	2.44	1.96	2.95	2.95
Oats	.16	.13	.12	.11
Protein Supplement	2.93	3.08	3.17	3.60
Corn Silage	3.15	2.98	2.82	2.84
Grass Silage	.08	.13	.38	.11
Hay	.77	1.25	1.00	1.01
Pasture	.05	.10	.08	.01
Feed Grinding Hired	.23	.20	.20	.30
Feed Costs	15.80	17.22	17.89	20.94**
Other Costs				
Labor	$ 1.45	$ 1.90	$ 1.70	$ 2.02
Tractor Power	.31	.49	.35	.50
Veterinary	.24	.18	.22	.13
Truck, Automobile, Telephone & Electricity	.23	.28	.29	.27
Buildings and Equipment	2.13	2.86	3.07	2.89
Taxes and Interest on Investment in Cattle	1.41	1.70	1.92	2.25**
Other Costs	5.77	7.41	7.55	8.06
Total Costs	$21.57	$24.63	$25.44	$29.00**
Number of Farms in Group	32	63	39	34
No. of Cattle Fed per Farm	211	181	283	312
Gain in Weight per Head for Feeding Period, Lb.	574	476	404	302
Average Number of Days Cattle Were Fed	317	280	224	177**
Gain in Weight per Head per Day, Lb.	1.80	1.68	1.84	1.71
Weight of Cattle Sold per Head, Lb.	982	980	1033	1075**
Feed Cost per 100 Lb. of Gain	$15.80	$17.22	$17.89	$20.94**
Building Investment per 100 Lb. of Gain	$13.47	$18.02	$17.87	$16.56
Death Loss, Percent	1.79	1.68	.78	.63**

**Differences in related means significant at the .01 level.

when it was produced by feeding light weight instead of heavy weight cattle.

When light weight cattle were purchased at an average weight of 408 lb. and sold at 982 lb., total costs of producing 100 lb. of gain averaged $21.57. Cost per 100 lb. of gain went up to $29.00 when heavy weight cattle were bought at 773 lb. and were sold at 1075 lb.

The higher cost of producing 100 lb. of beef from 773-lb. feeders compared with 408-lb. feeder calves was due mainly to spending $5.14 more for feed and $1.60 more for other costs, including buildings, equipment, taxes, and interest on investment in cattle.

Heavy feeder cattle cost more per head at time of purchase than light weight cattle. Thus, interest cost and personal property taxes per 100 lb. of gain go up as size of purchased cattle increases.

The average amounts of labor, tractor power, and feed used to produce 100 lb. of beef for different purchase weights are shown in Table 4.

COSTS FOR DIFFERENT SIZE HERDS

Figures in Table 5 show that costs of producing 100 lb. of beef declined as number of cattle on feed increased. Costs declined rapidly when number of cattle on feed increased from 53 to 123 head. Costs declined at a slower rate as cattle numbers increased from 123 to 238 head. Only a slight decline in costs occurred when the number of cattle on feed rose above 238 head.

Economies due to size of operation produced significantly lower costs for labor, tractor power, buildings, and equipment. Costs per 100 lb. of gain were lowered as follows when number of cattle on feed increased from 53 to 640 head: labor, $2.10; tractor power, $.42; and buildings and equipment, $1.33.

TABLE 4.—Average Amounts of Labor, Tractor Power, and Feed Used to Produce 100 Lb. of Beef in Ohio by Cattle Purchase Weights, 1963 and 1964.

	Purchase Weights			
	Less Than 450 Lb. Average 408	450-574 Lb. Average 504	575-699 Lb. Average 629	700 Lb. and Above Average 773
Labor, Hours	.97	1.27	1.13	1 35
Tractor Power, Hours	.25	.39	28	.40
Corn and Cob Meal, Lb	381	470	456	637
Shelled Corn, Lb	124	100	150	150
Oats, Lb.	8	6	6	5
Protein Supplement, Lb	59	59	60	67
Corn Silage, Lb.	787	745	705	710
Grass Silage, Lb	27	43	127	37
Hay, Lb.	70	114	91	92

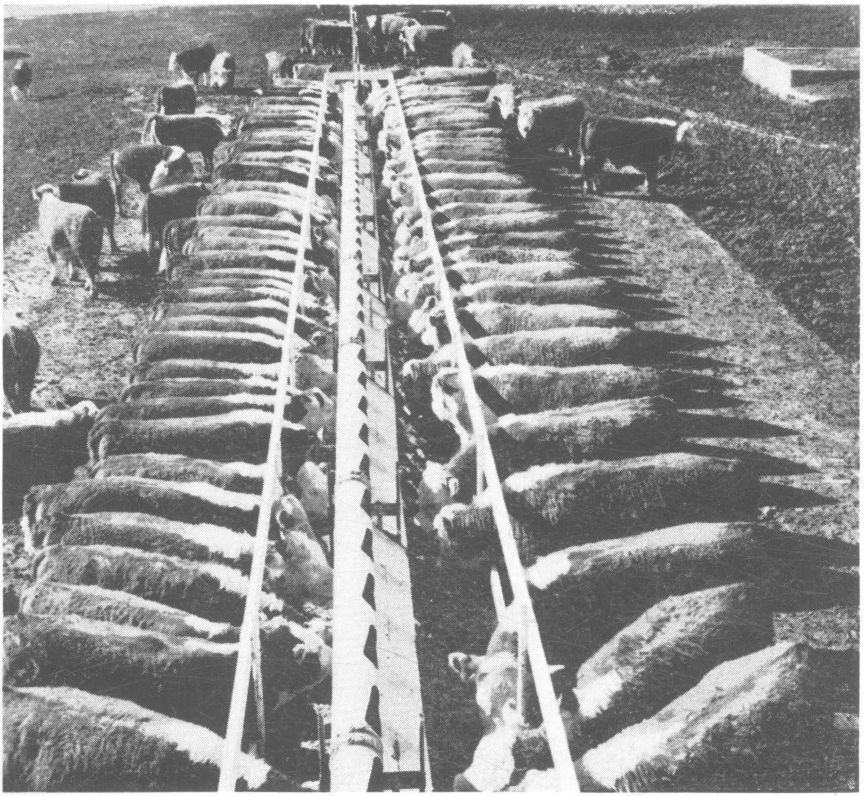
The large cattle feeders had lower feed costs than the small feeders. Part of this difference was due to cheaper protein supplement For example, protein feed cost $5.80 per 100 lb. when 53 head were fed compared with $4.83 per 100 lb. when 640 cattle were fed to slaughter

TABLE 5.—Average Costs to Produce 100 Lb. of Beef in Ohio by Number of Cattle Fed, 1963 and 1964.

	Average Number of Cattle Fed per Unit			
	53	123	238	640
Feed Costs				
Corn and Cob Meal	$ 9.93	$ 7.89	$ 6.21	$ 6.22*
Shelled Corn	1 04	2.59	3.38	2.71
Oats	.14	.18	.10	.05
Protein Supplement	3.54	3.02	3.19	3.19
Corn Silage	2.63	2.72	3.03	3.66
Grass Silage	.00	.15	.34	.23
Hay	1.81	1.13	.77	.50**
Pasture	.07	.09	.04	.05
Feed Grinding Hired	.34	.23	.16	.17
Feed Costs	$19 50	$18.00	$17.22	$16.78*
Other Costs				
Labor	$ 3 18	$ 1.80	$ 1.23	$ 1.08**
Tractor Power	.72	.38	.39	.30**
Veterinary	.23	.17	.13	.25
Truck, Automobile, Telephone & Electricity	.25	.29	.21	.30
Buildings & Equipment	3.51	2.91	2.43	2.18**
Taxes and Interest on Investment in Cattle	2.11	1.81	1.74	1.59
Other Costs	$10.00	$ 7.36	$ 6.13	$ 5.70
Total Costs	$29.50	$25.36	$23.35	$22.48**
Number of Farms in Group	30	72	32	34
Average Lb. of Cattle Fed per Farm	17,050	50,780	110,600	254,320
Gain in Wt. per Head for Feeding Period, Lb.	369	452	469	460
Average Number of Days Cattle Were Fed	225	259	261	258
Gain in Wt. per Head per Day, Lb.	1.63	1 72	1.82	1.83*
Weight of Purchased Cattle per Head, Lb.	581	574	570	551
Weight of Cattle Sold per Head, Lb.	950	1026	1039	1011**
Feed Cost per 100 Lb. of Gain	$19.50	$18.00	$17.22	$16.78**
Building Investment per 100 Lb. of Gain	$24.65	$20.22	$16.07	$14.71**
Death Loss, Percent	1.18	1.33	.86	1.65

*Differences in related means significant at the .05 level.

**Differences in related means significant at the .01 level.



Production costs declined as the number of cattle on feed increased.

TABLE 6.—Average Amounts of Labor, Tractor Power, and Feed Used to Produce 100 Lb. of Beef in Ohio by Lb. of Beef Produced, 1963-1964.

	Number of Head and Lb. of Beef Produced			
	Av. 53 Head Less Than 25,000 Lb. Av. 17,050	Av. 123 Head 25,000-84,999 Lb. Av. 50,780	Av. 238 Head 85,000-144,999 Lb. Av. 110,600	Av. 640 Head 145,00 Lb. and Above Av. 254,320
Labor, Hours	2.12	1.20	.82	.72
Tractor Power, Hours	.58	.30	.31	.24
Corn and Cob Meal, Lb.	632	502	395	396
Shelled Corn, Lb.	53	132	172	138
Oats, Lb.	7	9	5	2
Protein Supplement, Lb.	61	57	64	66
Corn Silage, Lb.	658	680	757	915
Grass Silage, Lb.	0	50	113	77
Hay, Lb.	165	103	70	45

weights. Part of this saving was probably due to purchasing protein supplement in larger quantities.

Building investment per 100 lb. of gain ranged from $24.65 when 53 animals were fed out to $14.71 when size of herd averaged 640 head. Part of this variation was due to inclusion of labor saving devices (auto-

TABLE 7.—Average Costs per Farm to Produce 100 Lb. of Beef in Ohio for Different Rates of Gain, 1963 and 1964.

	Gain per Head per Day			
	Less Than 1.50 Lb. Av. 1.29	1.50-1.74 Lb. Av. 1.62	1.75-1.99 Lb. Av. 1.86	2.00 Lb. and Above Av. 2.18
Feed Costs				
Corn and Cob Meal	$ 8.38	$ 7.73	$ 7.97	$ 5.89
Shelled Corn	1.73	2.53	2.51	3.12
Oats	.10	.14	.16	.06
Protein Supplement	3.39	2.92	3.21	3.33
Corn Silage	3.93	2.74	2.45	3.20*
Grass Silage	.08	.27	.20	.06
Hay	1.51	1.11	.98	.68*
Pasture	.16	.07	.04	.06*
Feed Grinding Hired	.27	.24	.23	.15
Feed Costs	$19.55	$17.75	$17.75	$16.55
Other Costs				
Labor	$ 1.94	$ 2.16	$ 1.60	$ 1.44*
Tractor Power	.46	.56	.34	.36*
Veterinary	.20	.17	.18	.23
Truck, Automobile, Telephone & Electricity	.24	.23	.30	.31
Buildings & Equipment	3.31	2.76	2.65	2.53
Taxes & Interest on Investment in Cattle	2.25	1.89	1.61	1.60
Other Costs	$ 8.40	$ 7.77	$ 6.68	$ 6.47
Total Costs	$27.95	$25.52	$24.43	$23.02**
No. of Farms in Group	30	49	59	30
No. of Cattle Fed per Farm	241	193	238	305
Gain in Weight per Head for Feeding Period, Lb.	354	438	450	445
Average No. of Days Cattle Were Fed	272	264	260	203**
Weight of Purchased Cattle per Head, Lb.	587	556	552	609
Weight of Cattle Sold per Head, Lb.	941	994	1042	1054**
Feed Cost per 100 Lb. of Gain	$19.55	$17.75	$17.75	$16.55*
Building Investment per 100 Lb. of Gain	$19.39	$17.32	$15.58	$15.71
Death Loss, Percent	1.62	1.50	1.26	.62*

*Differences in related means significant at the .05 level.

**Differences in related means significant at the .01 level.

TABLE 8.—Average Amounts of Labor, Tractor Power, and Feed Used to Produce 100 Lb. of Beef in Ohio by Rates of Gain, 1963 and 1964.

	Gain per Head per Day			
	Less Than 1.50 Lb. Av. 1.29	1.50-1.74 Lb. Av. 1.62	1.75-1.99 Lb. Av. 1.86	2.00 Lb. and Above Av. 2.18
Labor, Hours	1.29	1.44	1.07	.96
Tractor Power, Hours	.37	.45	.27	.29
Corn and Cob Meal, Lb.	533	492	507	375
Oats, Lb.	5	7	8	3
Shelled Corn, Lb.	88	129	128	159
Protein Supplement, Lb.	67	55	62	63
Corn Silage, Lb.	983	686	613	799
Grass Silage, Lb.	27	90	67	20
Hay, Lb.	137	101	89	62

mation) in the buildings. However, a more important factor was the degree of utilization of the buildings on the farm. Generally the smaller feed lots had facilities for more cattle than were being fed while the larger units tended to keep their lots filled to capacity on a year-round basis.

The average amounts of labor, tractor power, and feed used to produce 100 lb. of beef for different size herds are shown in Table 6.

COSTS FOR DIFFERENT RATES OF GAIN

Figures in Table 7 show that the cost of producing 100 lb. of beef declined as rate of gain increased. When the rate of gain was 1.29 lb. per head per day, cost of producing 100 lb. of beef was $27.95. However, when the daily rate of gain was 2.18 lb. per head, cost of producing 100 lb. of beef was reduced to $23.02.

Reductions in costs were statistically significant for labor, tractor power, and feed. Specifically, these costs per 100 lb. of gain were reduced as follows: labor, $50; tractor power, $.10; and feed, $3.00. The difference in building costs for the two rates of gain was $.78. However, this difference was not statistically significant.

The average amounts of labor, tractor power, and feed used to produce 100 lb. of beef for different rates of gain are shown in Table 8.

SUMMARY

Detailed information on beef feeding was obtained from 168 records kept by cattle feeders in 1963 and 1964.

The average cost of producing 100 lb. of gain on beef cattle was $25.12. Cost of feed amounted to $17.85 per 100 lb. of beef produced or 71 percent of the total cost.

One-third of the farmers in the study produced 100 lb. of gain at an average cost of $19.87. In contrast, another one-third of the farmers

had beef production costs averaging $30.85 or $10.98 higher per 100 lb. of gain.

When light weight cattle were fed to slaughter weights, the total cost of producing 100 lb. of gain averaged $21.57. Cost per 100 lb. of gain was $29.00 when heavy weight cattle were fed to slaughter weights.

Production costs declined as the number of cattle fed increased. However, only a slight decline in costs occurred when number of cattle on feed rose above 238 head.

The cost of producing 100 lb. of beef was $27.95 when the daily rate of gain was 1.29 lb. This cost was reduced to $23.02 when the rate of gain was 2.18 lb. per day.

The State Is the Campus for Agricultural Research and Development

Ohio's major soil types and climatic conditions are represented at the Research Center's 12 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 13 departments on more than 6200 acres at Center headquarters in Wooster, ten branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County: 344 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Vegetable Crops Branch, Marietta, Washington County: 20 acres

Western Branch, South Charleston, Clark County: 428 acres